

REMARKS/ARGUMENTS

Applicant respectfully requests reconsideration and allowance of the subject application.

Claims 1-26 were originally submitted.

Claims 16, 19-23 have been amended to address objections raised in the Action. Claims 25 and 26 have been amended to correct dependency errors. Claims 2 and 4 have been amended to address rejections raised in the Action. Claims 1, 5, and 24 have been amended to correct antecedent errors.

No claims are canceled.

Claims 1-26 remain in this application.

Objections

Claims 16, 19-23 have been amended to address objections raised in the Action. Claims 25 and 26 have been amended to correct dependency errors similar to claims 19-23. Applicant respectfully requests that the objections be withdrawn.

35 U.S.C. §112

Claims 2 and 4 are rejected based on a lack of antecedent basis. Claims 2 and 4 have been amended to address the rejection. Applicant respectfully requests that the §112 rejection be withdrawn

35 U.S.C. §102

Claims 1-8, 10-17, and 24-25 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,974,502 to DeKoning et al. (DeKoning). Applicant respectfully traverses the rejection.

DeKoning teaches splitting up large I/O requests from a computer into smaller, more manageable pieces and processing the pieces as individual I/O requests. A limited number of the smaller individual I/O requests are kept "active" any particular time, in order that a single large I/O request cannot preclude other I/O requests from making progress in the computer's controller. DeKoning discloses that both the size of the smaller I/O request pieces and the limited number of these pieces which will be "active" at any one time can be tunable parameters. In particular, DeKoning teaches that efficiency of data transfer can be improved between the computer and an array of disk drives by providing for increased overlap of activity in the controller. This increased overlap of activity results in increased controller throughput. (See Abstract of DeKoning).

Independent claim 1 recites "[a] storage device comprising:

a controller configured to receive jobs from a source;

a set of components that receive, complete, and pass on jobs; and

job flow analysis devices configured to the controller to track the number of jobs received, completed, and passed on by each component, wherein the controller compares the number of jobs received with a sum of the number of jobs completed and passed on by each component.

DeKoning fails to teach or disclose the storage device of claim 1. The Action argues that the element "a controller configured to receive jobs from a

1 source" as recited by claim 1 is taught by DeKoning at Col. 5, lines 24-25,
2 "declare[ing] that the disk array controller receives requests from the host". Claim
3 1 also recites the element a "a set of components that receive, complete, and pass
4 on jobs" which the Action argues is taught by DeKoning. The Action particular
5 states "that the disk controller receives and completes requests and then transfers
6 the data between the host and array. The host then delivers the data line". The
7 Action cites Col. 6, lines 9-17 of DeKoning.

8 The Action argues that DeKoning teaches the recited "controller" of claim
9 1 presenting the disk array controller 24 disclosed by DeKoning. The Action then
10 argues that the same disk array controller 24 teaches "a set of components that
11 receive, complete, and pass on jobs" as recited by claim 1; however, DeKoning
12 teaches that the disk array controller 24 is a distinct and particular component. In
13 other words, DeKoning does not teach a particular "controller" and particular "set
14 of components" as recited by claim 1.

15 Claim 1 further recites "job flow analysis devices configured to the
16 controller to track the number of jobs received, completed, and passed on by each
17 component". The Action argues that DeKoning teaches this element of claim 1,
18 stating "a request calculation unit, a comparator, and a RAID controller function
19 unit" are disclosed, and particularly citing Col. 6, lines 22-39 of DeKoning.

20 "As illustrated in FIG. 3, the disk array controller 44 may include: a request
21 size calculation unit (RSCU) 54, a comparator 56, a switch 58, a request division
22 unit (RDU) 60, and a RAID controller function unit (RCFU) 52". DeKoning, Col.
23 6, lines 22-26. DeKoning teaches that the "job flow analysis devices" that the
24 Action argues are taught in the "request calculation unit, a comparator, and a
25 RAID controller function unit" are part of the disk array controller. As discussed

1 above, claim 1 recites a particular controller that performs particular actions and a
2 particular set of components. DeKoning teaches that the "job flow analysis
3 devices" are included in the controller. Furthermore, the "job flow analysis
4 devices" recited in claim 1 are directed to "jobs received, completed, and passed
5 on" by "components" that are distinct from the disk array controller. As discussed
6 above, the Action argues that the "set of components" is taught by the disk array
7 controller of DeKoning. As taught by DeKoning, the disk array controller
8 includes "job flow analysis devices".

9 In view of the above, DeKoning does not teach or disclose each and every
10 element of claim 1. Thus, claim 1 is not anticipated by DeKoning. Applicant
11 respectfully requests that the §102 rejection of claim 1 be withdrawn.

12 **Dependent claims 2-4** are allowable at least by virtue of their dependency
13 on base claim 1. Applicant further provides additional arguments in support of
14 particular dependent claims below. Applicant respectfully requests that the §102
15 rejection of claims 2-4 be withdrawn.

16 Claim 3 further recites "wherein the set of components are arranged
17 serially". The Action cites Figure 3, components 42 and 52 as teaching the set of
18 components; however, components 42 and 52 are respectively the host 42 and the
19 RAID controller function 52. As discussed above, the Action argues that the disk
20 array controller 44 (of which the RAID controller function 52 is included), teaches
21 the controller and the set of components; however, the Action also argues that the
22 host 52 is also a component in the set of components; however, Fig. 3 of
23 DeKoning teaches otherwise.

24 Claim 4 further recites "wherein the job flow analysis devices are
25 comprised of job logs to record jobs received, completed, and passed on". The

1 Action cites Col. 6, lines 22-36 of DeKoning as teaching this element, arguing that
2 the "RAID controller function units and request size calculation units which log
3 the jobs"; however, what is described in this section addresses receiving I/O
4 requests and calculating the amount of data to be transferred. There is no teaching
5 or disclosure as to "job logs to record jobs received, completed, and passed on" as
6 recited by claim 4.

7 **Independent claim 5 recites "[a] method comprising:**

8 determining a number of jobs received, completed, and passed on by
9 a process;

10 comparing the number of jobs received by the process and a sum of
11 the number of jobs completed and passed on by the process;

12 deciding whether the sum of a threshold amount and of the number
13 of jobs completed and passed on is greater than the number of jobs
14 received; and

15 performing a corrective action when the sum of the threshold
16 amount and the number of jobs completed and passed on versus the number
17 of jobs received is not acceptable.

18 DeKoning fails to teach or disclose the method of claim 5. The Action
19 argues that the element "determining a number of jobs received, completed, and
20 passed on by a process" as recited by claim 5 is taught by DeKoning at Col. 6,
21 lines 28-32, and particularly argues that "the functions of the request size
22 calculation unit". "The RSCU 54 is operative for receiving I/O requests from the
23 host computer 42 via I/O request line 48 and for calculating the amount of data
24 which each I/O request requires to be transferred between the host 42 and the array
25 46." DeKoning, Col 6, lines 28-32. The RSCU 54 receives I/O requests and
calculates the amount of data the I/O requests requires; however, the RSCU 54

1 does not determine jobs received, completed and passed on by a process” as
2 recited by claim 5.

3 Claim 5 recites “comparing the number of jobs received by the process and
4 a sum of the number of jobs completed and passed on by the process”. The Action
5 argues that this element is taught by DeKoning, citing the “comparator’s frctions”
6 and Col. 5, lines 32-35 of DeKoning. The cited section of DeKoning is : “[t]he
7 comparator 56 receives a signal from the RSCU 54 indicative of the size of a
8 current request and compares the size of the current request to a LARGE I/O SIZE
9 parameter received from the RCFU 52”. The is no teaching or disclosure in
10 DeKoning as to a “number of jobs completed or passed on by the process”. The
11 comparator 56 of DeKoning is directed to determining requests or jobs yet to be
12 completed.

13 Claim 5 further recites the additional elements of “deciding whether the
14 sum of a threshold amount and of the number of jobs completed and passed on is
15 greater than the number of jobs received” and “performing a corrective action
16 when the sum of the threshold amount and the number of jobs completed and
17 passed on versus the number of jobs received is not acceptable”. The recited
18 elements are directed to completed jobs which DeKoning fails to disclose or teach.

19 In view of the above, DeKoning does not teach or disclose each and every
20 element of claim 5. Thus, claim 5 is not anticipated by DeKoning. Applicant
21 respectfully requests that the §102 rejection of claim 5 be withdrawn.

22 Dependent claims 6-8, 10-12 are allowable at least by virtue of their
23 dependency on base claim 5. Applicant further provides additional arguments in
24 support of particular dependent claims below. Applicant respectfully requests that
25 the §102 rejection of claims 6-8, 10-12 be withdrawn.

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2 Claim 7 further recites "wherein the determining is performed by a counter
3 for the jobs received, a counter for the jobs completed, and a counter for the jobs
4 passed on". The Action cites Col. 6, line 30 of DeKoning as teaching this
5 element; however this cited section of KeKoning states "calculating the amount of
6 data which each I/O request requires to be transferred between the host 42 and the
7 array 46". There is no teaching or disclosure as to separate counters for "jobs
8 received", "jobs completed" and "jobs passed on" as particularly recited by claim
9 7.

10 Claim 8 further recites "wherein the determining is further comprised of
11 tracking the jobs in job logs included in the counters", and benefits from similar
12 arguments presented in support of claim 4 regarding "job logs".

13 Claim 11 further recites "wherein the process is one of a set of serial
14 processes that receive, complete, and pass on jobs". The Action cites Fig. 4 of
15 DeKoning as disclosing that "the set of processes is done in serial"; however, Fig.
16 4 merely illustrates the RFCU 52 of DeKoning. The Action does not particularly
17 address where DeKoning teaches or discloses "processes that receive, complete,
18 and pass on jobs".

19 **Independent claim 13 recites "[a] storage device comprising:**

20 a series of processes configured to count jobs received, completed,
21 and passed on by each process;

22 a set of counters to track numbers of jobs received, completed, and
23 passed on by each process in the series of processes; and
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1 a controller that compares from the counters the number of jobs
2 received versus the sum of the number of jobs completed and passed on by
3 each process.

4 DeKoning fails to teach or disclose the storage device of claim 13. The
5 Action argues that Col. 6, lines 9-17 of DeKoning teaches the element "a series of
6 processes configured to count jobs received, completed, and passed on by each
7 process" recited by claim 13, that "the disk array controller receives and completes
8 requests and then transfers the data between the host and array. The host then
9 delivers the data line". The cited section of DeKoning discloses that "the host 42
10 delivers data to the controller, via data line 50, where it is separated, processed,
11 and distributed to the array of disk drives 46 according to the appropriate RAID
12 level." DeKoning, Col. 6, lines 14-17. This section of DeKoning, and DeKoning
13 in general does not teach or disclose counting "jobs received, complete, and
14 passed on by each process" as recited in claim 1.

15 Claim 13 further recites "a set of counters to track numbers of jobs
16 received, completed, and passed on by each process in the series of processes".
17 Applicant presents the arguments above in support of claim 7.

18 Claim 13 also recites "a controller that compares from the counters the
19 number of jobs received versus the sum of the number of jobs completed and
20 passed on by each process". The Action cites Col. 7, lines 55-67 and lines 1-51 of
21 DeKoning stating that the "Number of Concurrent Large I/O Pieces parameter
22 (a.k.a, the sum of the number of jobs completed and passed on) that is tracked and
23 compared by the devices above". The cited section of DeKoning, and DeKoning
24 in general, as discussed above is directed to processing I/O requests or requests for
25 jobs. DeKoning does not teach or disclose tracking or accounting for completed
jobs.

1 In view of the above, DeKoning does not teach or disclose each and every
2 element of claim 13. Thus, claim 13 is not anticipated by DeKoning. Applicant
3 respectfully requests that the §102 rejection of claim 13 be withdrawn.

4 **Dependent claims 14-17** are allowable at least by virtue of their
5 dependency on base claim 13. Applicant respectfully requests that the §102
6 rejection of claims 14-17 be withdrawn.

7 **Independent claim 24** recites “[a] storage device comprising:

8 means for counting a number of jobs received, completed, and
9 passed on by processes in a controller of the storage device;

10 means for determining if a number of jobs completed and passed on
11 is sufficient for a number of jobs received by each process;

12 means for resetting the processes; and

13 means for requesting for the jobs to be resent to the processes.

14 DeKoning fails to teach or disclose the storage device of claim 24. Claim
15 24 particularly recites “means for counting a number of jobs received, completed,
16 and passed on by processes in a controller of the storage device”. The Action
17 argues that Col. 6, lines 22-36 of DeKoning teaches this element and states that
18 “RAID controller function units and request size calculation units which log the
19 jobs”. As discussed above in support of claim 4, this section discloses receiving
20 I/O requests and calculating the amount of data to be transferred. There is no
21 teaching or disclosure as to “counting a number of jobs received, completed, and
22 passed on by processes” as recited by claim 24.

23 In view of the above, DeKoning does not teach or disclose each and every
24 element of claim 24. Thus, claim 24 is not anticipated by DeKoning. Applicant
25 respectfully requests that the §102 rejection of claim 24 be withdrawn.

1 **Dependent claims 25** is allowable at least by virtue of its dependency on
2 base claim 24. Applicant respectfully requests that the §102 rejection of claim 25
3 be withdrawn.

4 Claim 25 further recites "counting comprises a job log for jobs received,
5 completed, and passed on by each process". The Action argues that Col. 6, lines
6 22-36 of DeKoning teaches this element; however, as discussed above in support
7 of claim 7 this section does not teach or disclose counters or "counting that
8 comprises a job log for jobs received, completed, and passed on by each process"
9 as recited by claim 25.

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11 **35 U.S.C. §103**

12 Claims 9 and 26 are rejected under 35 U.S.C.103(a) as being unpatentable
13 over DeKoning as applied to claims 5 and 24 above, in view of U.S. Patent No.
14 5,166,927 to Iida et al (Iida). Applicant respectfully traverses the rejection.

15 The Action argues that "DeKoning teaches the limitations of claims 5 and
16 24 for the reasons above. DeKoning's invention differs from the claimed
17 invention in that there is no specific reference to bandwidth analysis".

18 As discussed above, DeKoning does not teach the each and every element
19 of claims 5 and 24 above, from which claims 9 and 26 depend respectively.
20 Therefore the "bandwidth analysis" taught by Iida does not help. Accordingly a
21 combination of DeKoning and Iida is improper. Applicant respectfully requests
22 that the §103 rejection of claims 5 and 26 be withdrawn.

23 Claims 18-23 are rejected under 35 U.S.C.103(a) as being unpatentable
24 over DeKoning, further in view of U.S. Patent No. 5,459,866 to Akiba et al.
25 (Akiba). Applicant respectfully traverses the rejection.

1 **Independent claim 18** recites “[a] processor-readable medium comprising
2 processor-executable instructions for analyzing job flow in a process, the
3 processor-executable instructions comprising instructions for storage device
4 comprising:

5 tracking a number of jobs received, jobs completed, and jobs passed
6 on by the process;

7 comparing the number of jobs received by the process with the
8 number of jobs completed and passed on the process; and

9 determining a discrepancy whenever the number of jobs received by
10 the process exceeds the number of jobs completed and passed on the
11 process.

12 The Action argues that “DeKoning teaches the element of “tracking a
13 number of jobs received, jobs completed, and jobs passed on by the process” is
14 argued by the Action as taught by Col. 6, lines 22-39 of DeKoning. The Action
15 particularly presents the “request size calculation unit, the comparator and the
16 RAID controller function unit”. However, as discussed above, none of the cited
17 components teach or suggest tracking a number of jobs, and specifically tracking
18 “jobs completed” and “jobs passed on” as recited by claim 18.

19 It is further argued by the Action that the element “comparing the number
20 of jobs received by the process with the number of jobs completed and passed on
21 the process” is taught in Col. 7, lines 55-57, lines 1-51 of DeKoning. This section
22 as discussed above is teaches processing I/O requests or requests for jobs.
23 DeKoning does not teach or suggest “comparing the number of jobs received by
24 the process with the number of jobs completed and passed on the process” as
25 recited by claim 18.

1 The Action also argues that the element "determining a discrepancy
2 whenever the number of jobs received by the process exceeds the number of jobs
3 completed and passed on the process" as recited by claim 18 is taught in Col. 6,
4 lines 45-47 of DeKoning which the Action presents states "If the size of the
5 current I/O request is less than or equal to the LARGE I/O SIZE parameter, then
6 the entire request is delivered to the RCFU 52 for processing". The Action
7 presents that Col. 6, lines 47-52 of DeKoning states "If the size of the current I/O
8 request is greater than the LARGE I/O SIZE parameter, the request is delivered to
9 the RDU 60 which, among other things, divides the current I/O request into a
10 plurality of block requests which are each equal to or smaller in size than the
11 LARGE I/O SIZE parameter". The cited sections of DeKoning, however, do not
12 teach or suggest "completed and passed" jobs as recited in claim 18.

13 The Action admits that "DeKoning's invention differs from the claimed
14 invention in that there is no specific reference to instructions to be utilized by the
15 processor. DeKoning fails to teach the following limitation of claim 18, which
16 states 'A processor-readable medium comprising processor-executable instructions
17 for analyzing job flow in a process, the processor-executable instructions
18 comprising instructions for: ...' The Action looks to Akiba for teaching the
19 following "In a support system for software development implemented on a
20 computer, a file input/output distinction related to a utility whose program can not
21 be analyzed is preliminarily registered in the support system, job control language
22 which is the subject of automatic production of a job flow specification is input,
23 the job control language and a source program are analyzed and basic job flow
24 information is produced. A job flow specification is automatically produced by
25 deriving a file input/output distinction from a load module name in the input job

1 control language and one of source program analysis information corresponding
2 thereto, utility information and job control language analysis information" citing
3 the Abstract of Akiba. As discussed above, DeKoning does not teach the each and
4 every element of claim 18. Therefore, the teachings of Akiba do not help.
5 Accordingly a combination of DeKoning and Akiba is improper. Applicant
6 respectfully requests that the §103 rejection of claim 18 be withdrawn.

7 **Dependent claims 19-23** are allowable at least by virtue of their
8 dependency on base claim 18. Applicant further provides additional arguments in
9 support of particular dependent claims below. Applicant respectfully requests that
10 the §103 rejection of claims 19-23 be withdrawn.

11 Claim 20 further recites "wherein the process is part of a set of serial
12 processes". The Action argues that Fig. 4 of DeKoning teaches this element;
13 however, as discussed above in support of claim 11, Fig 4 teaches an RFCU 52
14 which does not a set of serial processes".
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CONCLUSION

All pending claims 1-26 are in condition for allowance. Applicant respectfully requests reconsideration and prompt issuance of the subject application. If any issues remain that prevent issuance of this application, the Examiner is urged to contact the undersigned attorney before issuing a subsequent Action.

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Respectfully Submitted,

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